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ABSTRACT

This study investigates sociopsychological variables in an educational context. The question of interest concerns the relationship between the conceptual complexity of teachers and the type of teacher-student interaction in the classrooms. Specifically, this study asks if a teacher's belief system is related to a pattern of asymmetrically or reciprocally contingent interaction between teacher and students in the classroom. To assess the extent of reciprocally versus asymmetrically contingent interactions in classrooms, the Hit-Steer observational system was devised, which is designed to reveal the patterns of teacher and pupil interaction, especially the extent to which the behavior the patterns of teacher and pupil interaction, especially the extent to which the behavior of each is contingent on the behavior of the other, by assessing the number of times a teacher or pupil attempts to influence ("hits") the other and whether the other modifies his behavior as a result of the "hit" (whether the other "is steered" or not). Thirty-three seventh-grade classrooms were selected for intensive observation. Results indicate that teachers who function in a relatively concrete and rigid way tend to be more directive and controlling than others, and they tend to dominate classroom interaction. (Author/HMV)

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Statement of the problem

The present study was designed to investigate social psychological variables in an educational context. The question of interest concerned the relationship between the conceptual complexity of teachers and the type of teacher-student interaction in their classrooms. Specifically: Is a teacher's belief system (Harvey, 1969) related to a pattern of asymmetrically or reciprocally contingent interaction (Jones and Thibaut, 1958) between teacher and students in the classroom?

Based on his research on the manner in which individuals relate to their environment, Harvey (1969) has postulated a series of four "belief systems". According to Harvey, a belief system represents an individual's predisposition to perceive and respond to ego-involving stimuli in a consistent manner. A belief system acts as a filter through which an individual selectively responds to his environment. Belief systems differ in content as well as on the structural dimension of concreteness-abstractness. Harvey (1969) has summarized research findings on the four belief systems:

characteristics of individuals functioning at a relatively concrete level (System 1) include a greater tendency toward more extreme, either-or and good-bad judgments, a tendency toward trite or normative behaviors, a greater reliance on status and authority, and a tendency to hold opinions with great certainty. Persons functioning at System 2 similarly tend to hold opinions strongly but also to distrust and reject the normative responses to established custom and authority that persons at system 1 accept without question. Those at system 3 are somewhat more abstract and less dogmatic than individuals operating at system 1 or 2, but they are mainly concerned with social relationships and are often skilled at interpersonal manipulation to avoid social isolation or rejection. Persons functioning at system 4 are characterized by high task orientation and information seeking, low dogmatism, creativity, openness to inputs from diverse sources, and a high independence of judgment. Belief systems have been measured primarily with a sentence completion instrument called the "This I Believe" Test (Harvey, 1964) which consists of ten referents. Subjects are required to respond to each referent in the form of an opinion. The protocols are then rated by trained scorers who assign system values (1, 2, 3, or 4) to the responses.

Harvey et al. (1966, 1968) have found that teachers' belief systems are related both to the classroom climates they create and to their students' performance. Both classroom climate and student performance were assessed by observers using multidimensional rating scales. The present study tried to clarify these relationships by measuring actual teacher-student interactive behaviors.

Jones and Thibaut (1958), in their discussion of behavior in interactions, began by asking: in a dyadic situation, how important is the behavior of one person in determining the behavior of the other? In reciprocally contingent interactions, "the behavior of one actor is contingent on the behavior of the other and vice versa" (p. 157). In asymmetrically contingent interactions, however, "the behavior of one actor is contingent on the behavior of another, but the other's behavior is independently determined" (p. 155). Asymmetrically contingent interactions are often governed by a hierarchical organization, such as characterizes "traditional" classrooms. Because the teacher has the highest position, he may make the students' behavior contingent on his direction but need not modify his own behavior in response to theirs. "Alternative" schools, which presumably offer students more freedom to determine what and how they learn than "traditional" schools, might be characterized by reciprocally contingent interactions between teacher and students; in extreme cases, the teacher's behavior may be fully contingent on the students' desires but not the reverse.

To assess the extent of reciprocally versus asymmetrically contingent interactions in classrooms, the Hit-Steer observational system was devised. (The terms reflect a conception of influence attempts and their effects developed by Thibaut, Coules and Robinson and presented in Thibaut and Riecken in 1955. The Hit-Steer system is designed to reveal the patterns of teacher and pupil interaction, especially the extent to which the behavior of each is contingent on the behavior of the other, by assessing the number of times a teacher or pupil attempts to influence

("hits") the other and whether the other modifies his behavior as a result of the hit (whether the other "is steered" or not).

The system comprises two parallel sets of four categories. The first set defines behaviors when the teacher tries to direct the students' behavior; the second, when a student tries to influence the teacher's behavior. Each set contains one category for hits and three categories for the various kinds of responses: a compliant response, or Steer; a refusal to modify one's behavior at the other's request, or No-Steer; and a response that is not clear or not made, or Conditional Steer. For example, if the teacher were to say, "Open your math book to page 51," and the students did, a Teacher Hit followed by a Pupil Steer would be scored. If the students said, "No, we won't. We want geography now instead," a Pupil No Steer and Pupil Hit would be scored. Then, if the teacher modified his behavior to accommodate the students' suggestion, a Teacher Steer would be scored. Finally, if the teacher were to say, "OK, then do the problems on page 54 tonight", and the student response could not be observed, a Pupil Conditional Steer would be scored.

It was hypothesized that absolutistic teachers (belief system 1), because of their reliance upon status and power (Kritzberg, 1965), and their high rule orientation and low encouragement of individual responsibility and originality (Coates, Harvey, and White, 1968), would make more attempts to influence their students (more teacher hits) than would abstract, flexible teachers (system 4). It was further hypothesized that teachers of lower conceptual complexity would not permit their students to make as many attempts to influence them (fewer pupil hits) as the more complex teachers would.

Methods

Subjects

Teachers and students in 51 classrooms in the metropolitan area of a large midwestern city voluntarily participated in the study. Thirty-three classrooms were selected for intensive observation based on the mean class score on the Pupil Perceptions of Origin Influence questionnaire (Koenigs and Hess, 1970). The sample included 17 seventh grade classrooms in 8 inner-city schools primarily serving black students, 8 seventh grade classrooms from a racially integrated suburban community, and 8 "alternative" school classrooms in the same suburb. Teachers in both urban and suburban districts represented a mixture on the variables of sex and race.

Procedures

The "This I Believe" Test was administered to 51 classroom teachers, who responded to "This I Believe" about education, discipline, friendship, and nine other topics. The responses were scored by two raters who had attended a scoring workshop with Harvey and then scored practice materials independently to a criterion of +.90 correlation. For the research protocols the inter-scorer correlation was +.84 before conferring. When disagreements occurred, a discussion by the raters yielded a final score.

For each teacher a system value from 1 to 4 or a combination of 2 systems was assigned as a function of the total protocol. When more than one system was evident, the scorer identified and reported the predominant system first and the subordinate system second. Thus, a System 1-3 describes a person functioning primarily at System 1 level but also having some System 3 functioning, while a System 3-1 is the reverse. All proto-

cols were ranked from 1 to 4 on their primary system; then, within each primary system, protocols were again ranked from 1 to 4 on the secondary system. When only one system was evident in a protocol, it was given the same number for its secondary system as for its primary system. Thus, "a pure 3" would be ranked a 3-3 and would be higher than 3-1 and 3-2 but lower than 3-4 and all system 4's. Table 1 presents the distribution of system scores in the sample. For the analyses the rankings were divided into approximate fourths, comprised of (a) low fourth, all pure system 1; (b) middle half, scores from 1-2 to pure 3; and (c) high fourth, scores from 3-4 to pure 4.

Trained observers used the Hit-Steer system to score teacher-pupil interaction for two hours in 33 classrooms. Two observers used the Hit-Steer Observation System to a criterion of 85% agreement before data collection began. The principal observer scored interaction in all observation periods, while the reliability observer scored interaction in a random sample of one-third of the sessions, or 25 observation periods. Based upon a refinement of Scott's (1955) procedure for calculating observer agreement, which eliminates the overestimation of reliability attributable to chance, inter-observer agreement was calculated at 85% over all sessions. To make the data comparable, mean scores in the 8 observation categories for each classroom were equated for a 20-minute sample period.

Results

One important outcome of the study was data about the kinds of interactions in typical classrooms as teachers and students went about their day-to-day activities. Table 2 presents the mean, range, and standard

deviation of scores in the eight observation categories based on the sample of 33 classes. During a 20-minute period, the rate of influence attempts by the teacher ranged from 1 every 3 minutes to 3 in 1 minute, with a mean of 1 1/2 Hits every minute. In the same period, the rate of Pupil Hits ranged from 1 every 3 minutes to 1 1/2 in a minute, averaging less than 1 per minute. Thus, overall, teachers made Hits about twice as often as students.

To determine whether patterns of classroom interaction differed as a function of teachers' belief system, a multivariate analysis was performed, with the three rankings of belief system scores as the independent variable and the eight observational categories as the dependent variables. Table 3 presents the mean scores on the observational variables for the three belief system rankings. Note that for the three response categories for Pupils and the three response categories for Teachers--the Steer, No Steer, and Conditional Steer Categories--the table entries are actually ratios of the number of tallies in the corresponding hit category. The data are presented this way because the number of Steers in a class, for example, depended on the number of Hits that had been made, and that number varied by classroom; hence, the number of Steers couldn't be compared directly. (Since percentages are binomially rather than normally distributed, all statistical analyses were computed after an arc-sin transformation was performed (Snedecor, 1956).)

Data analysis revealed significant relationships between a teacher's system score on the "This I Believe" Test and several categories of the Hit-Steer observation system. Differences between the number of Teacher Hits observed in classrooms of teachers functioning at the various levels

of complexity were significant at the .01 level, with less complex teachers making almost twice as many hits as more complex teachers in a comparable period. Low scoring teachers made more than twice as many hits as their pupils did during the observation sessions, while high scoring teachers made slightly fewer hits than their students. These results are displayed in Figure 1. Furthermore, less complex teachers rejected their pupils' influence attempts significantly more often than other teachers ($p < .03$), while students in classes taught by high scoring teachers refused to follow their teachers' directions significantly more than students in other classes ($p < .03$).

Location was not considered a conceptual variable in this study, because there were no conceptual or operational definitions by which the various schools could be clearly distinguished from each other and validated as members of specific classes of schools. However, to investigate possible differences between the patterns of influence in city, suburban, and alternative classrooms, a multivariate analysis of scores in the eight observation categories was run on the data from the 33 classrooms observed. Mean scores for the 20-minute sample period are presented in Table 4. Since the levels of the Location factor were not ordinal, tests for linear or curvilinear trends could not be performed. Instead, the one-degree-of-freedom tests compared the scores for each level to the mean scores for all levels. First, classes in the Alternative school and one Suburban school were found to differ significantly from the mean of all classes. Specifically, in the Alternative classes there were significantly fewer Pupil Conditional Steers as a function of Teacher Hits ($p < .04$). That is, students in the Alternative school tended to respond to teachers' influence attempts with refusals

to change their behavior and with attempts to influence the teacher relatively (but not statistically) more than their peers in other schools. Second, classes in Suburban school 1 differed from the overall mean with fewer Teacher Conditional Steers as a function of Pupil Hits (p .04), more Pupil Steers as a function of Teacher Hits ($p < .04$), and fewer Pupil No Steers as a function of Teacher Hits ($p < .03$). Third, although the general test for differences between the innercity classes and the overall mean was not significant, the innercity teachers did make significantly more Teacher Hits ($p < .002$) than the other teachers.

The major results of this study support both hypotheses: (1) that, compared to more flexible, abstract teachers, teachers who function in a relatively concrete and rigid way tend to be more directive and controlling; and (2) that they tend to dominate classroom interaction while permitting students few opportunities to influence activities or procedures. Thus, the classrooms of the less complex teachers may be characterized by asymmetrically contingent interaction between teacher and students, while those of the more complex teachers would be characterized by reciprocally contingent interaction. The critical question that remains concerns the relative impact of these variables on students' motivation and academic achievement. Research now underway should provide clues about these relationships.

Table 1

Distribution of Belief System Scores

Belief System Score	N by School Location		
	Inner City	Suburban	Alternative
Low			
1-1	12	2	0
Medium			
1-3 to 3-3	4	3	3
High			
3-4 to 4-4	1	3	5

Total = 33

Table 2

Hit-Steer Observational Results

Items	Observation Categories							
	Teacher Hit	Pupil Steer	Pupil No Steer	Pupil Cond. Steer	Pupil Hit	Teacher Steer	Teacher No Steer	Teacher Cond. Steer
Mean (n = 33)	27.64	23.03	.17	2.54	16.70	14.87	.71	1.12
Range	7.0 to 55.6	5.5 to 53.0	0.0 to 0.9	0.0 to 6.9	6.7 to 29.6	6.7 to 24.3	0.0 to 3.7	0.0 to 6.8
Standard Deviation	12.25	12.28	.25	1.44	6.71	5.33	.83	1.67

Table 3

Observational Results for Various Belief Systems

Belief System	Observational Variables							
	Teacher Hits	Pupil Steers / Teacher Hits	Pupil No Steers / Teacher Hits	Pupil Conditional Steers / Teacher Hits	Pupil Hits	Teacher Steers / Pupil Hits	Teacher No Steers / Pupil Hits	Teacher Conditional Steers / Pupil Hits
Low (System 1; n = 14)	34.01	88.24	0.18	8.60	15.83	91.41	4.99	3.41
Medium (Systems 1-3 to 3-3; n = 10)	28.79	79.68	0.09	9.97	14.95	82.41	3.61	13.98
High (Systems 3-4 to 4; n = 9)	19.48	76.28	1.08	0.96	20.61	91.12	3.74	5.19

Figure 1

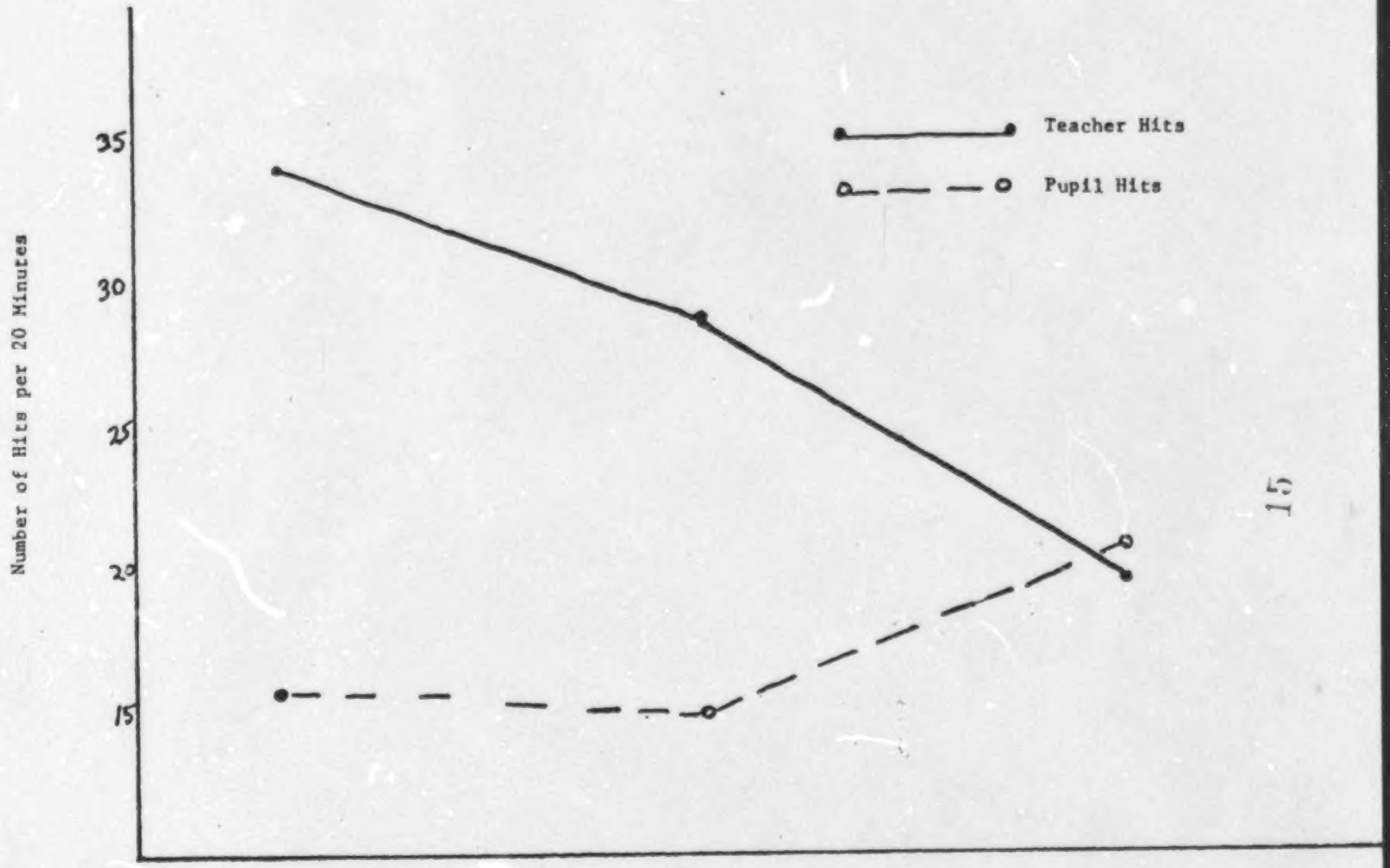
Number of Hits per 20 Minutes
35
30
25
20
15
Teacher Hits
Pupil Hits
Low
(System 1)
n = 14
Medium
(System 1-3 to 3-3)
n = 10
High
(System 3-4 to 4)
n = 9

Table 4

Observation Results in Various Schools

Location	Observation Variables							
	Teacher Hits	Pupil Steers / Teacher Hits	Pupil No Steers / Teacher Hits	Pupil Cond. Steers / Teacher Hits	Pupil Hits	Teacher Steers / Pupil Hits	Teacher No Steers / Pupil Hits	Teacher Cond. Steers / Pupil Hits
Inner-City (n = 17)	35.96	87.62	.13	10.09	14.71	92.04	3.87	3.70
Alternative (n = 8)	18.89	64.91	2.04	10.26	19.86	88.43	2.69	9.14
Suburban 1 (n = 4)	17.05	85.30	1.18	9.13	17.85	92.03	5.80	1.68
Suburban 2 (n = 6)	25.70	74.65	1.68	15.28	17.18	84.02	5.77	10.40

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